

We claim:

1. An apparatus for coupling a projection lens to a projection optical signal generating device, said apparatus comprising:

a frame for supporting said projection lens in alignment with said projection optical signal generation device and defining a cooling chamber between said projection lens and said projection optical signal generating device; wherein said cooling chamber is for containing a liquid; and

a bubble chamber for trapping air bubbles present in said liquid, wherein one of said frame's walls forms an opening which fluidly connects said cooling chamber to said bubble chamber, and wherein said bubble chamber comprises a flat shelf surface surrounding said connecting opening, wherein said flat shelf surface's total length is greater than at least two times said connecting opening's diameter.

2. The apparatus of claim 1, wherein said bubbles in said bubble chamber are positioned away from said formed opening responsive to said relative positional angle of said frame and bubble chamber from an upright position.
3. The apparatus of claim 2, wherein said frame and bubble chamber are positioned at an angle between 70 and 80 degrees relative to a 90 degree upright position.
4. The apparatus of claim 1, wherein said flat shelf's total length is greater than at least three times said connecting hole's diameter.
5. The apparatus of claim 1, wherein said flat shelf surface is circular in shape.
6. The apparatus of claim 1, wherein said flat shelf surface is rectangular in shape.

7. The apparatus of claim 1, wherein said flat shelf surface is square in shape.
8. The apparatus of claim 1, wherein said formed opening's diameter is less than or equal to one half inch.
9. The apparatus of claim 1, wherein said formed opening diameter is less than or equal to 8.8 mm.
10. A projection system for producing an image to be displayed on a screen, comprising:
  - a projection lens;
  - a projection optical signal generating device; and
  - a coupler device comprising a frame for supporting said projection lens in alignment with said projection optical signal generation device and defining a cooling chamber between said projection lens and said projection optical signal generating device; wherein said cooling chamber is for containing a liquid;

wherein said coupler comprises a bubble chamber, wherein one of said frame's walls forms a connecting hole which fluidly connects said cooling chamber to said bubble chamber, and wherein said bubble chamber comprises a flat shelf surrounding said connecting hole, wherein said shelf's total length is greater than at least two times said connecting hole's diameter.
11. The system of claim 10, wherein substantially all bubbles in said bubble chamber are located at one end of said bubble chamber's shelf in response to said frame and bubble chamber relative positional angle in said system.
12. The system of claim 11, wherein said frame and bubble chamber are positioned at an angle between 70 and 80 degrees relative to a 90 degree upright position.

13. The system of claim 10, wherein said shelf's total length is greater than at least three times said connecting hole's diameter.
14. The system of claim 10, wherein said flat shelf surface is circular in shape.
15. The system of claim 10, wherein said flat shelf surface is rectangular in shape.
16. The system of claim 10, wherein said flat shelf surface is square in shape.
17. The system of claim 10, wherein said formed opening's diameter is less than or equal to one half an inch.
18. The system of claim 10, wherein said formed opening diameter is less than or equal to 8.8 mm.
19. A method of removing bubbles from a coupler device's optical path, said coupler for coupling a projection lens to a projection optical signal generating device, said coupler comprising a frame for supporting said projection lens in alignment with said projection optical signal generation device and defining a cooling chamber between said projection lens and said light signal generation device, the steps comprising:
  - providing a bubble chamber attached to said frame for trapping air bubbles in said liquid, wherein one of said frame's walls forms an opening which fluidly connects said cooling chamber to said bubble chamber, and wherein said bubble chamber comprises a flat shelf surface surrounding said connecting opening, wherein said shelf surface's total length is greater than at least two times said connecting opening's diameter; and
  - positioning said coupler's frame and bubble chamber in an end product between 70 and 80 degrees relative to an upright 90 degree position.

20. The system of claim 19, wherein said shelf's total length is greater than at least three times said connecting hole's diameter.